Third, the Examiner erroneously states that the *resin* is disclosed as PVF. The resin is not made of PVF. Instead, PVF is a transparent film used as a rear surface member of the solar cell module.

Fourth, the specification at page 6 clearly discloses a recognition that the sodium concentration may be in a range, i.e. "as the quantity of sodium in the resin increases, the power generation performance degrades." Thus, it is incorrect to interpret the specification as limiting the concentration of sodium in the resin to strictly 3 μg/g, not more and not less. The invention is not so limited. The invention as disclosed is to prevent diffusion of sodium ions from the resin to the semiconductor junction, regardless of the specific sodium concentration therein. Accordingly it is respectfully submitted that the 35 U.S.C. § 112 rejection is in error and should be withdrawn.

35 U.S.C. § 103 Rejection

The rejection of claims 16, 18 – 20 and 28 – 30 as being unpatentable over Japanese patent document No. JP 11-307791 ("JP '791) in view of Baskett et al., (US 3,957,537) Hanoka et al., (US 5,476,553) Brandhorst (US 4,131,486) and Spitzer (US 4,667,060), is respectfully traversed, and reconsideration of this ground of rejection also is requested.

The Claimed Invention

The invention provides a solar cell module with increased light efficiency and high power generation without degradation. With reference to Fig. 1, the invention provides a solar cell element (3); an incident light transmitting member (1) made of a glass adhered at a light incidence side of the solar cell element by a resin (4); and a rear surface member (2) comprising a transparent resin film adhered at a rear surface side of the solar cell element by a resin (4).

The solar cell element (3) comprises a semiconductor junction (31-32) so as to form an electric field and is sealed with each of the resin adhering the light incidence side light transmitting member and the rear surface member. The resin for adhering the incident light transmitting member at the light incidence side of the solar cell element

contains a sodium ion depositing from the incident light transmitting member (paragraph 0027 published application), and the solar cell element comprises a one conductive type crystalline semiconductor substrate (31) between the semiconductor junction and the resin containing the sodium ion so as to shield a diffusion of sodium ion to the semiconductor junction; and an anti-reflection layer (37) between the one conductive type semiconductor substrate and the resin containing the sodium ion, said anti-reflection layer comprising a silicon dioxide layer.

In accordance with the claimed invention, a transparent rear surface member (2) is used to increase the amount of light entering the solar cell for production of electric power. In the prior art, such transparent member resulted in increased permeation of water into the module, with resulting degradation of power generation. The invention is based on the discovery that this undesired degradation is related to diffusion of sodium ions from the front glass surface into the resin when water enters into the module, and subsequent degradation of the semiconductor junction caused by the increased sodium ion concentration. Accordingly, the present invention solves this discovered problem by forming the semiconductor junction (31-32) at a location away from or opposite to the incident light transmitting or glass surface.

As shown in Figs. 1 and 2, the p-n junction (between layers 31 and 32, Fig. 1, and between layers 51 and 53, Fig. 2) is formed opposite from the glass surface 1 as opposed to the prior art solar cell module as shown in Fig. 4.

The Prior Art Does Not Suggest The Claimed Structure

The extensive prosecution history of this application contains multiple explanations of the JP '791 reference. Foremost, it has been explained that the JP '791 reference fails to disclose a solar cell element that has a crystalline semiconductor substrate disposed on a side of the resin containing the sodium ion and a p-type amorphous silicon layer disposed on an opposite side of the resin so as to shield a diffusion of the sodium ion from the resin to the semiconductor junction.

As stated, at the time the present application was filed, it was commonly understood by a person skilled in the art that the semiconductor junction of a solar cell must be

made thin, and consequently to position it to the light entering surface side of the device, in order to realize sufficient generation of electron-hole pairs and sufficient minority carriers reaching the junction area.

By contrast, despite the common practice and knowledge at the time, the present invention positions the solar cell element in a way that light enters from a side opposite the junction.

The claimed invention provides the following effects, which are not provided by the prior art:

a) it prevents sodium ions extracted from the surface glass positioned at the light entering side from reaching the semiconductor junction of the solar cell element;

b) it delays the decrease in efficiency of generating power; and

c) it provides a reliable solar cell module suitable for outside use.

These features, which are achieved by the claimed invention, that reflect a teaching that is opposite to the common practice in the art at time, i.e. wherein a semiconductor junction of a solar cell module is positioned on the opposite side of the light entering surface, are not suggested by any of the prior art.

The prior art reference JP 11-307791 shows such a prior art solar cell. The solar cell element of JP '791 as disclosed in Fig. 2 teaches a p-n junction 13-11 adjacent to the glass layer 3. In other words, JP '791 arranges the p-n junction interface on the light incidence side, in complete accordance with the common sense technical knowledge at the time of the JP '791 disclosure and in accordance with the common wisdom in the art as explained above. None of the other cited prior art references to Baskett et al., Hanoka et al., Brandhorst or Spitzer contains any teaching that would suggest to reverse or invert the structural composition of the JP '791 device, which would be required in order to arrive at the present claimed invention.

Specifically, the solar cell element of JP '791 as disclosed in Fig. 2 teaches a p-n junction 13-11 adjacent to the glass layer 3. The Office action at pages 7 and 8 proposes to dismantle and reconstruct the JP '791 module in order to meet the claim limitations. This is improper under the law. The mere fact that Brandhorst and Spitzer may disclose that it is known that a photovoltaic junction may be located at the rear

face of a solar cell, is irrelevant to the question of whether it would have been obvious to dis-integrate the structure of the JP '791 device as taught and disclosed therein, and to completely reconstruct it to meet the claim limitations of the present claims. Such dismantling and wholesale reconstruction of a prior art structure is not based on any recognition in the prior art of any problem that would be solved by the proposed reconstruction, but instead appears to be a classic example of hindsight reconstruction of the prior art for the sole purpose of rejecting a patent application claim. There is presented in the Office action no technological reason for making such a wholesale reconstruction of the device that is specifically taught and disclosed by the JP '791 reference.

For a proposed modification of the prior art to be "obvious" under the meaning of 35 U.S.C. § 103, there must exist in the prior art recognition of some technological problem, shortcoming or disadvantage, and also a teaching, recognition or suggestion of a solution to that problem, shortcoming or disadvantage, which would lead one of ordinary skill to the claimed invention. Thus, the issue of whether or not it would have been within the level of ordinary skill in the art "to take the solar cell in JP '791's Figure 2, flip it over it over, *(sic)* and then insert it into JP '791's Fig. 1" does not establish that it would have been obvious to do so under the established law of obviousness pursuant to 35 U.S.C. § 103. Further, it is well-established that a prior art reference must be evaluated for what it teaches to those skilled in the art, and not for its alleged breadth of disclosure. Thus, the issue of whether or not the JP '791 is "limited to layers 12 and 13 to be at the front surface" is not the same as a specific teaching or suggestion to reconfigure and reconstruct the JP '791 device such that the layers correspond to the structure as set forth in the present claims.

The newly cited prior art references to Baskett et al. and Hanoka et al. are relied upon for the proposition that glass is a preferred material for a transparent member of a solar module, and for the proposition that EVA resin degrades under the influence of ultraviolet light, respectively. These propositions by themselves do not suggest the reconstruction of the JP '791 reference as proposed in the Office action. Neither Baskett nor Hanoka disclose or suggest the claimed structure, and consequently no

combination of these references with the JP '791 reference could result in the claimed structure.

Similarly, the Brandhorst and Spitzer references of record, relied on for the general proposition that "the presence of a photovoltaic junction at the rear face of a solar cell is well known in the art," do not contain any reasoning or teaching that would have motivated a person of ordinary skill to have taken apart and reconstructed the JP '791 reference as proposed in the Office action.

Conclusion

In view of the above, it is respectfully submitted that claims 16, 18 – 20 and 28 – 30 are neither anticipated nor rendered obvious by the prior art of record. Reconsideration and withdrawal of the rejection of these claims and issuance of a Notice of Allowance are requested.

Please charge any fee or credit any overpayment pursuant to 37 CFR 1.16 or 1.17 to Novak Druce Deposit Account No. 14-1437.

RESPECTFULLY SUBMITTED,					
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